

Spring 2015

Kickapoo Environmental Office

The Green Clan

Working Together for a Better Community!
ktik-nsn.gov/kickapooenvironmentalprotection.htm
Phone: 785-486-2601



Streamside Best Management Practices

Streamside forestry Best Management Practices (BMPs) are practices for preventing or reducing water pollution into rivers, streams and other water bodies. In Kansas, streamside forestry BMPs generally include forest buffers, forest stand improvement, sustainable timber harvest, willow cuttings, tree revetments and livestock fencing. This article will give a short review of forested buffers, forest stand improvement and timber harvesting as it relates to sustaining water quality.

Streamside Forest Buffers

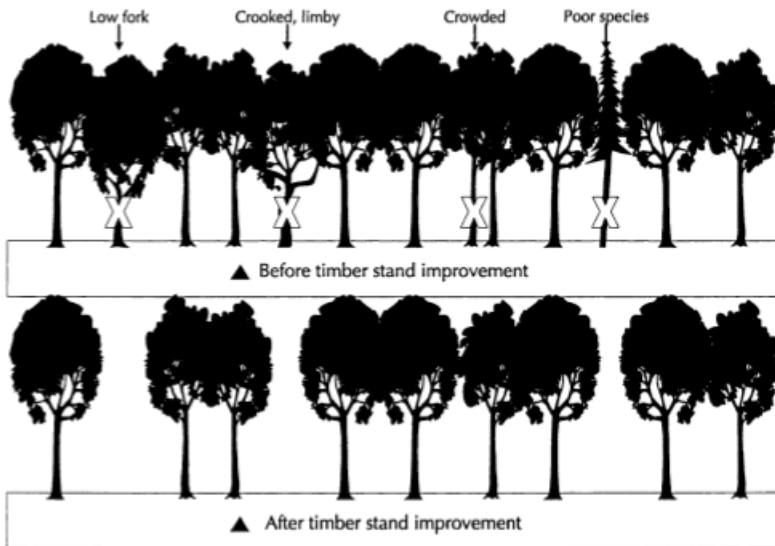
Streamside forest buffers are natural occurring, or planted strips of trees and shrubs located next to streams and other water bodies. The minimum suggested width for forest buffers is considered to be a 1 active channel width (ACW) distance from the top of the streambank, with a minimum distance of 66 feet for smaller streams. ACW is the width of the stream channel at the bank-full flow. In Kansas, that occurs approximately once every 1.2 years.

An ideal forest buffer consists of three zones parallel to the stream. The first zone is the streambank stability zone which extends approximately 15 feet from the top of the bank. This zone typically consists of larger trees whose deep root systems stabilize the streambank. Management of this zone should be limited to stabilizing the bank and removing problem vegetation. Occasional removal of high-value trees may take place where water quality will not be compromised, and adequate regeneration exists.

The second zone also consists of larger tree species, but is much wider than zone one (recommended 50' minimum), and has different management recommendations. The extended width of zone two allows plenty of time for surface runoff to infiltrate the forest floor, removing pollutants before they enter the adjacent waterway. Management for timber harvest and wildlife habitat is recommended in this zone.

The third zone consists of dense grasses and forbs, and is located just beyond the extent of zone two. This zone has a minimum recommended width of 15', and the dense vegetation is intended to slow-down, break-up, and absorb as much overland flow as possible. Mowing or grazing this zone will help to recycle trapped nutrients and stimulate vegetative growth.





Timber stand improvement for fast growth and valuable wood products.

Forest Stand Improvement

Forest Stand Improvement (FSI) is an excellent tool to help maintain the health of your streamside forest buffer. FSI includes pruning, killing vines, and selection/release of crop trees for future timber harvest, wildlife habitat, or aesthetics.

When performing FSI in streamside areas, it is important to keep a few rules in mind:

- Minimize disturbance of the forest floor, and keep the organic litter layer intact.
- Keep machinery out of the stream with properly designed crossings.
- Remove large trees and branches that fall into the stream.
- Properly dispose of woody debris by removing it for other uses, or creating wildlife brushpiles.
- Do not remove more than 25% of trees directly adjacent to the streambank.

Timber Harvest

Timber harvest is a component of sustainable streamside forest management, and can also allow for an added source of income. When planning a harvest in a streamside forest, consider the following to maintain the integrity of the area.

- Plan roads well.
- Minimize the number of equipment stream crossings, and place at a 90 degree angle with the channel.
- Harvest when soils are dry or frozen.
- Do not remove more than 25% of the trees directly adjacent to the channel.
- Remove harvest generated tops and other debris from the channel.
- Do not skid trees across the channel.
- Stabilize disturbed or bare soil to minimize erosion.
- Restore stream channels to their approximate pre-harvest condition.
- Reseed and replant areas to assure healthy forest in the future.



Kansas Forest Service
2610 Clafin Road
Manhattan, KS 66502



Living Alongside Nature

In today's world we are required to coexist with the natural environment as a part of everyday life. We have distinct advantages over plants and animals in acquiring habitat to live, which gives us the responsibility to facilitate this cohabitation to the best of our abilities. Shortfalls are manifested as dead carcasses along roadways, increased number of threatened and endangered species, and expanding urban development. Since the need to expand our infrastructure and accommodate our increasing population is immanent, there are methods we can use to protect and improve the lives of our neighbors in nature.

Forest Succession

Before we look at improvement methods, we should identify the natural processes habitats undergo over time. The structure and plant composition of forests changing over time is a process called **succession** (See Bibliography for Reference*). As a field ages the plant community changes from open prairies to mature climax forest (Figure 1.). Wildlife present within those transtion zones changes based on shelter and foraging needs. The health and abundance of wildlife is significantly improved by managing these zones, which brings us to the installment of buffers throughout the reservation.



What are Buffers?

Buffer strips are installed along agricultural fields and roadways to soften abrupt changes in vegetation while increasing habitat variation. This activity is often referred to as, “feathering,” and is used to taper the transition between tall hardwood trees and prairies. Different habitat types accommodate different species, and appropriate management methods can be implemented when landowner goals are determined.

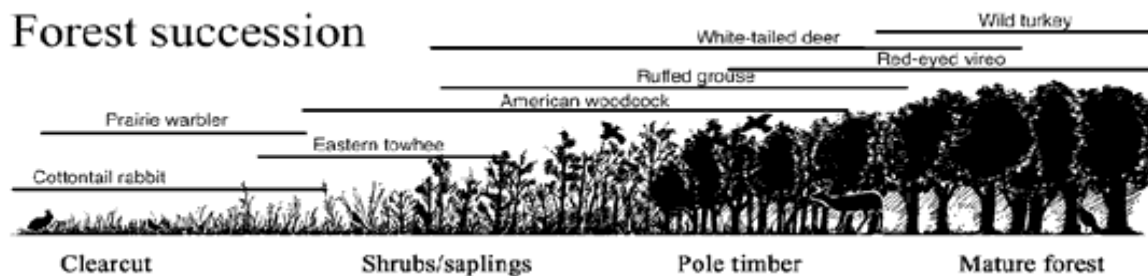
What Can You Do?

As a landowner you have the opportunity to manage all or part of your land in a way that benefits your goals while simultaneously improving wildlife needs. The first step is to identify objectives in terms of income, timber, firewood, wildlife, watershed protection, and aesthetics. In addition to defining your overall goals, you also need to decide on your objectives in terms of wildlife management. Do you want to manage for game animals such as deer, rabbits, or quail, or are you interested in accommodating non-game species like birds of prey or reptiles and amphibians? The next step after identifying your objectives is to contact the Kickapoo Environmental office to discuss ways in which we can help incorporate your wildlife and land management needs.

Lewis E. Messner
Wetland Program
Environmental Specialist
Phone: 785.486.2601 x 5

Jim Reitz
Non-Point Source Pollution
Environmental Specialist
Phone: 785.486.2601 x 3

Forest succession



* Amanda D. Rodewald, P. (n.d.). <http://ohioline.osu.edu/>. Retrieved January 27, 2015, from Bulletin Extension: http://ohioline.osu.edu/b915/part_one.html



Science of Water

Moud Safadi, Environmental Specialist, 785-486-2601 x-1

Water is a molecule called H₂O that contains two atoms of hydrogen and one atom of oxygen. It's a transparent, odorless liquid that can be found in lakes, rivers, streams and oceans. Fresh water is the result of the Earth's water or hydrologic cycle. Essentially, the sun's heat causes surface water to evaporate. It rises in the atmosphere, then cools and condenses to form clouds. When enough water vapor condenses, it falls back to the surface again as rain, sleet, or snow (Water Quality Association, 2014). Water is one of the most essential elements to health and is so important that your body actually has a specific drought management system in place to prevent dehydration and ensure your survival. You might think this important substance is everywhere, but you must never take it for granted.

How much water is there on Earth?

As you know, the Earth is a watery place. But just how much water exists on, in, and above the planet? Approximately 71 percent of the Earth's surface is water-covered, and the oceans hold about 96.5 percent of all Earth's water (USGS, 2014). However, water also exists in the air as water vapor, in icecaps and glaciers, in the ground as soil moisture and in aquifers (underground layer of water-bearing permeable rock or unconsolidated materials). To break the numbers down, 96.5 percent of all the Earth's water is contained within the oceans

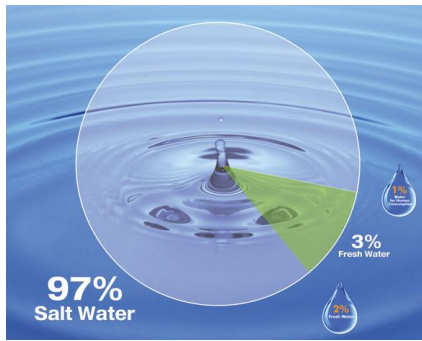
as salt water, while the remaining 3.5 percent is fresh water. About 3.5 percent of the planet's water is fresh, but 1.6 percent of the planet's water is locked up in the polar ice caps and glaciers. Another 0.36 percent is found underground in aquifers and wells. Only about 0.036 percent of the planet's total water supply is found in lakes and rivers. That is still thousands of trillions of gallons, but it's a very small amount compared to all the water available on earth.

Water Science

Although we drink it, cook with it, wash, fish and swim in it, we nearly always overlook the special relationship it has with our lives. Droughts cause famines (extreme scarcity) and floods cause death and disease. It makes up over half of us, and without it, we die within a few days. Liquid water has significance as a solvent, a solute, a reactant and a bio-molecule, structuring proteins, nucleic acids and cells. H₂O is the second most common molecule in the Universe (behind hydrogen, H₂), the most abundant solid material and fundamental to star formation. There are a hundred times as many water molecules in our bodies that the sum of all the other molecules put together. Life cannot evolve or continue without liquid water, which is why there is so much excitement about finding it on Mars and other planets.

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Surface Water

Surface water is water on the surface of the planet such as in a stream, river, lake, wetland, or ocean. It can be contrasted with groundwater and atmospheric water. Non-saline surface water (water from lakes, rivers or shallow wells) is replenished by precipitation and by recruitment from groundwater. Typically, surface water is not directly fit for drinking. 97% is found in the oceans and can't be used for drinking because of its salt content. The other 3% of water is fresh, and most of that is locked up in ice or glaciers (WQA, 2015).

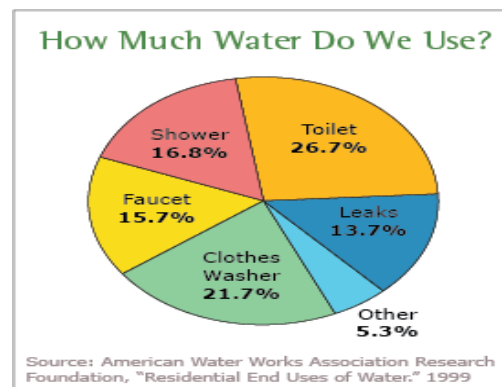
Groundwater

Groundwater is the water located beneath the earth's surface in soil pore spaces and in the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water. When rainwater or melting snow seeps into the ground, it collected in underground pockets called aquifers, which store the groundwater and form the water table (highest level of water that an aquifer can hold). Water

levels can reach the water table or fall well below it depending on such factors as rainfall, drought, or the rate at which the water is being used. Groundwater usually comes from aquifers through a drilled well or natural spring.

Water Consumption

A typical American uses 80-100 gallons of water every day. This amount includes washing, watering lawns, waste disposal and drinking. According to the Water Quality Association, people drink less than 1% of the water coming into their homes. Unless you have your own well, you likely have to pay around \$1.50 per 1000 gallons, or \$0.0015 per gallon. For a family of four using 100 gallons per person each day, that adds up to about \$18 per month. According to the United States Environmental Protection Agency, the average American family uses more than 300 gallons of water per day at home.



Roughly 70 percent of the water used occurs indoors (shower, toilet, faucet, clothes washer, leaks). Nationally, outdoor water use accounts

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for 30 percent of household use yet can be much higher in drier parts of the country and in more water-intensive landscapes (irrigation, watering lawns and gardens).

Water Regulation

For the Kickapoo Nation in Kansas, water is regulated by the Clean Water Act. The primary objective of the Clean Water Act (CWA) is to restore and maintain the physical, chemical and biological integrity of the nations' surface/ground waters. Pollutants regulated under the CWA are classified as either toxic, conventional (biochemical oxygen, total suspended solids, fecal coliform, oil and pH) or nonconventional pollutants (any pollutant not identified as either conventional or priority). Section 106 of the Clean Water Act authorizes EPA (Environmental Protection Agency) to provide federal assistance to states (including Indian Tribes) to establish and implement ongoing water pollution control programs.

Water Problems in the Future

Water is one of the greatest current and future global challenges. Predictions show that by 2050 the world's population will have grown from 7 to 9 billion. As the population of the United States and the world keeps growing, more pressure is put on our water resources. Predictions show that by 2050 the world's population will have grown from 7 to 9 billion. This upsurge means the need for water will

increase by over 50 percent, if we continue our consumption at the current rate.

Water Management

Science provides many practical solutions to minimizing the present level at which pollutants are introduced into the environment and for remediating (cleaning up) past problems. With that said, all of these solutions come with some cost (both monetary and societal). In our everyday lives, a great deal can be done to minimize pollution if we take the time to recycle materials whose production creates pollution and if we act responsibly with household chemicals and their disposal. In addition, there are choices we make each day that can also affect the quantity of pollutants our actions will introduce into the environment.

According to Dr. Ken Rubin of the Department of Geology and Geophysics, our standard of living is based upon practices which are inherently "dirtier" than those of our distant ancestors, although they too polluted their environment to some extent. In the end, there are many choices on the personal and societal level that we must make that affect the amount of pollution our town or country will be forced to live with.

"When the well's dry, we know the worth of water"

~Benjamin Franklin~

Solid Waste Program Update by Sonny Fee

The Kickapoo EPA solid waste program had another great community clean up December 8th to the 12th. We usually fill 6 roll off dumpsters, but this round we reduced it to 4 this time. This is a great program, I hate to see it go. The last community clean up that US EPA will allow us to conduct will be June 22 – 26th.

More Trouble with Monarch Migrations

The past few years have been hard on the monarch butterfly. Their population has declined to a degree that puts them up for consideration as an endangered species. This has come about thanks largely to habitat loss blamed on use of agricultural herbicides. Noting the decline has sparked widespread concern amongst conservationists, gardeners, and concerned members of the general public. Millions have begun a concerted campaign to support the monarch population by planting milkweed, which the butterflies require for some of the most important parts of their life cycle.

Despite their intentions to help the butterflies, in some cases it can actually cause harm. A recent study, published in *Proceedings of the Royal Society*, by Satterfield, Maerz, Sonia, and Altizer confirm that some of these efforts may actually be sabotaging the monarch, rather than rescuing it. The reason being that the milkweed being planted is the wrong kind. It has the detrimental effect of turning the normally migratory insects into ones that refuse to migrate. By maintaining a sedentary lifestyle it is making the already

low numbers susceptible to the spread of a parasite.

The type of milkweed the monarchs normally prefer (*Asclepius tuberosa* or Butterfly Milkweed) is a type that goes out of season starting in the fall. This gives an incentive for the butterflies to keep moving on their normal migration route, south to Mexico. The type of milkweed which is most available through retailers is known as a tropical milkweed. This specific type continues to be productive through fall and up until winter.

Keep this in mind while you plan for your spring gardens. You can't go wrong with planting native species.

